UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF PREVENTION, PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

March 28, 2000

CAS #: 2303-17-5
P.C. Code: 078802

SUBJECT: Revised Tier II Modeling Using the Index Reservoir (IR) and Percent Crop Area (PCA) for Triallate and its Degradate Trichloropropene sulfonic acid (TCPSA) on winter wheat.

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This Tier II PRZM-EXAM modeling using the index reservoir (IR) scenario and the percent crop area (PCA) adjustment factor, replaces previous Tier II drinking water assessments for winter wheat. This modeling was conducted to correct an error in the crop harvesting dates in the PRZM input file.

The 1 in 10 year annual peak of cumulative triallate residue (triallate + TCPSA) concentration in drinking water from application on winter wheat is not expected to exceed 4.22 µg and 9.24 µg triallate equivalents/L for 5 cm (2 inch) soil incorporation and no soil incorporation, respectively, in a North Dakota winter wheat index reservoir scenario adjusted for a wheat PCA (Table 1). The 1 in 10 year

annual mean of cumulative triallate residue concentration is not expected to exceed 0.82 µg and 1.82 µg triallate equivalents/L for 5cm (2 inch) soil incorporation and no soil incorporation, respectively. The 36 year annual mean of cumulative triallate residue concentration is not expected to exceed 0.36 µg and 0.81 µg triallate equivalents/L for 5 cm (2 inch) soil incorporation and no soil incorporation, respectively.

Table 1. Triallate Residue Concentration (µg. triallate equivalents/L) in Surface Water for Winter Wheat in North Dakota (IR + PCA)

Concentration	Triallate		TCPSA		Cumulative Triallate Residues*	
	2" incorporation	No incorporation	2" incorporation	No incorporation	2" incorporation	No incorporation
1/10 Peak	3.11	6.83	1.11	2.41	4.22	9.24
1/10 90 Day Average	1.30	2.87	0.91	1.98	2.21	4.85
1/10 Annual Mean	0.39	0.87	0.43	0.95	0.82	1.82
36 Year Annual Mean	0.15	0.35	0.21	0.46	0.36	0.81

* Summation of triallate and TCPSA

Modeling Procedures

For purposes of the IR& PCA assessment for triallate and TCPSA, the input parameters for the PRZM and EXAMS simulation were similar to those used in modeling simulations reported in Drinking Water Exposure Assessment of the EFED Triallate Science Chapter. Modification in the PRZM files required changes in the size and length of the field to represent the Shipman Reservoir watershed. The index reservoir EXAMS environment scenario was used instead of the MSPOND environment scenario. PRZM and EXAMS input files are available upon request.
The PCA adjustment factor was 0.56.

Assumptions and Uncertainties

PRZM-EXAMS modeling with the index reservoir and the PCA is intended for use as a screening estimate for drinking water. That is, the estimate should be higher than most values that are seen in areas where a particular crop is grown. A preliminary assessment comparing monitoring data for a few chemicals to estimates made using these methods indicate the estimate may not be consistently conservative. However, monitoring data at drinking water facilities is sparsely available and we are unable to check the validity for most crops against monitoring data at this time.

Index Reservoir

The index reservoir represents a watershed that is more vulnerable than most used as drinking water sources. It was developed from a real watershed in western Illinois (Jones et al., 1997). The index reservoir is used as a standard watershed that is combined with local soils, weather, and cropping practices to represent a vulnerable watershed for each crop that could support a drinking water supply.

A single steady flow has been used to represent the flow through the reservoir. Discharge from the reservoir also removes chemical from it so this assumption will underestimate removal from the reservoir during wet periods and overestimates removal during dry periods. This assumption can both underestimate or overestimate the concentration in the reservoir depending upon the annual precipitation pattern at the site. The index reservoir scenario uses the characteristic of a single soil to represent all soils in the basin. Soils can vary substantially across even small areas, thus, this variation is not reflected in these simulations.

The index reservoir scenario does not consider tile drainage. Areas that are prone to substantial runoff are often tile drained. This may underestimate exposure, particularly on a chronic basis (the watershed on which the IR is based had no documented tile drainage). Additionally, EXAMS is unable to easily model spring and fall turnover which would result in complete mixing of a chemical through the water column during these events. Because of this inability, Shipman City Lake has been simulated without stratification. There is data to suggest that Shipman City Lake does stratify in the deepest parts of the lake at least in some years. This may result in both an over and underestimation of the concentration in drinking water depending upon the time of the year and the depth the drinking water intake is drawing from. A full description of the Index Reservoir is provided in the "*Guidance for Use of the Index Reservoir in Drinking Water Exposure Assessment"* from EFED upon request.

Percent Crop Correction Factor

The PCA factor adjusts for the highest specific crop coverage on a 8 digit Hydrologic Unit Code (HUC) watershed (Effland et al., 1999). The PCA for wheat is 0.56. Limitations in the data used to develop the PCA include:

- The size of the 8-digit HUC may not provide reasonable estimates of actual PCAs for smaller watershed capable of supporting a community water system.

- The conversion of county-level data to watershed-based percent crop areas assume the distribution of the crops within a county is uniform and homogeneous. Distance between the treated fields and the water body is not addressed.

- The PCA's were generated using 1992 Census of Agriculture. However, recent changes in the agriculture sector from farm bill legislation may significantly impact the distribution of crops throughout the country. Therefore, the approach assumes that year-to-year variation in cropping patterns are minimal, thus, have minimal impacts.

References

Effland, W., N. Thurman, I. Kennedy, and S. Abel. 1999. " *Proposed Methods for Determining Watershed-derived Percent Crop Areas and Considerations for Applying Crop Area Adjustments to Surface Water Screening Models*, presented to the FIFRA Science Advisory Panel, March 1999. http://www.epa.gov/pesticides/SAP/1999/pca_sap.pdf

Jones, R.D., S.W. Abel, W. Effland, R. Matzner, and R. Parker. 1998. "An Index Reservoir for Use in Assessing Drinking Water Exposures. Chapter IV in *Proposed Methods for Basin-Scale Estimation of Pesticide Concentrations in Flowing Water and Reservoirs for Tolerance Reassessment*., presented to the FIFRA Science Advisory Panel, July 1998. http://www.epa.gov/pesticides/SAP/1998/index.htm